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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,217	09/24/2003	Yukihiro Sumida	0717-0515P	1566

2292 7590 05/28/2004
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EXAMINER
QI, ZHI QIANG

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N

10/668,217

Applicant(s)

SUMIDA ET AL.

Examiner

Mike Qi

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☒ Claim(s) 13-15 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☒ Certified copies of the priority documents have been received in Application No. 09/292,595.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/24/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by US 6,266,108 (Bao et al).

Claim 12, Bao discloses (col.6, lines 8 – 35; Fig.1) that a reflective liquid crystal display device comprising:

- a light source (30), a light guide plate (20) (an optical guide member), i.e., an illumination section; and a panel (0), i.e., a reflection type LCD having a display region, and the electrode (11) functions as the pixel electrodes for performing the display function; and the light guide plate (20) having lower and upper faces (as the first and second principal faces of the optical guide member) opposite to each other and left and right end faces (as the first and second end faces) opposite to each other;

- the panel (0) (the reflection type LCD) is disposed on the lower face of the light guide plate (20);
- the light from the light source (30) enters the light guide plate (20) at the left end face (the first end face), exits the light guide plate (20) at the lower face (the first principal face) of the light guide plate (20) so as to be incident on the panel (0) (the reflection type LCD) and reflected therefrom, reenters the light guide plate (20) (the optical guide member) at the lower face (the first principal face), and exits the light guide plate (20) (the optical guide member) at the upper face (the second principal face) toward a viewer;
- Bao also discloses (col.6, line 52 – col.8, line 65; Figs.1, 3) that the light guide plate (20) (optical guide member) has a periodic structure (stepwise surface) formed on the upper face (second principal face) of the light guide plate (20), and the illumination light advancing horizontally in the light guide plate (20) is reflected at the step (21) and enters into the panel (0), while the illumination light reflected from the substrate (2) is emitted through the planar section (22) of the light guide plate (20), such that the periodic structure (stepwise surface) has propagation portions (advancing the light and emitting the light at planar section 22) and reflection portions (reflecting the light at step 21) alternating along a third direction at an angle from the light source (30) such as an angle of inclination θ ;
- the third direction coincides neither the horizontal direction (X) (the first direction parallel to the light source 30) nor the vertical direction (Y) (the second direction perpendicular to the light source 30), and a third direction at an angle from the light

source (30) such as a direction of an angle of inclination θ is coplanar with the X direction and Y directions (first and second directions).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,266,108 (Bao et al) in view of US 6,259,499 (Yamanashi).

Claim 1, Bao discloses (col.6, lines 8 – 35; Fig.1) that a reflective liquid crystal display device comprising:

- a light source (30), a light guide plate (20) (an optical guide member), i.e., an illumination section; and a panel (0), i.e., a reflection type LCD having a display region, and the electrode (11) functions as the pixel electrodes for performing the display function; and the light guide plate (20) having lower and upper faces (as the first and second principal faces of the optical guide member) opposite to each other and left and right end faces (as the first and second end faces) opposite to each other;
- the panel (0) (the reflection type LCD) is disposed on the lower face of the light guide plate (20);
- the light from the light source (30) enters the light guide plate (20) at the left end face (the first end face), exits the light guide plate (20) at the lower face (the first

principal face) of the light guide plate (20) so as to be incident on the panel (0) (the reflection type LCD) and reflected therefrom, reenters the light guide plate (20) (the optical guide member) at the lower face (the first principal face), and exits the light guide plate (20) (the optical guide member) at the upper face (the second principal face) toward a viewer;

- the light source (30) is disposed in the vicinity of a side of the display region extending substantially in parallel to the horizontal direction (X) (the first direction).

Bao does not explicitly disclose that a color filter layer having a regular array of a plurality color filters, each of a plurality of color composite pixels being defined by a corresponding one of the plurality of color filters, and the plurality of color pixels having a pitch P1 along a first direction (X) (parallel to the light source) and the plurality of color composite pixels having a pitch P2 along a second direction (Y) (perpendicular to the light source), the pitch P1 being smaller than the pitch P2.

However, Yamanashi discloses (col.4, line 36 – col.5, line 42; Figs. 1-4) that using color filter for the reflecting color display, and the color filter portion (5) having pixels arranged in the pixel arrangement of stripe-type arrangement (Fig.2), the delta-type arrangement (Fig.3) or the mosaic-type arrangement (Fig.4), and these pixel arrangements having a regular array of a plurality of color pixels corresponding one of the plurality of color filters, and the color pixels having a pitch along the horizontal direction (X) (the first direction) and a pitch along the vertical direction (Y) (the second direction) (e.g., Fig.2), and the pitch along the horizontal direction (P1) being smaller than the pitch along the vertical direction (P2). Yamanashi indicates (col.1, lines 41-49)

that such arrangement provides a reflecting color liquid crystal display device having capability of displaying dark and vivid colors and multiple colors.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the color pixels corresponding to the color filters as claimed in claim 1 for achieving a vivid colors display.

Claims 2 and 10, Bao discloses (Fig.1) that the light emitted from the light guide plate (20) (the illumination section) is subjected at the panel (0) (the reflection type LCD), and the light is emitted toward the viewer, so that the viewer is located in a direction of specular reflection, and the light source (30) is disposed in an upper direction (relative to the direction of the light specular reflection to the viewer) of the display region of the reflection type LCD (such as a front light guide).

Claim 3, Bao discloses (Figs.1 and 11) that the light source (30) is disposed near an end of the reflection type LCD. Inherently, the reflection type LCD has terminals to coupling the reflection type LCD to external display circuitry, and the light source also has terminals to connect the electrical wires. The terminals must be arranged closer as much as possible, and that was common and known in the art for the assembling more compact and reducing the unnecessary crosstalk. Therefore, it would have been obvious to those skilled in the art to dispose the light source near an end of the reflection type LCD as claimed in claim 3 for achieving more compact assembling.

Claim 4, Bao discloses (col.6, lines 24-25; and lines 39-41; Fig.1) that the light source (30) is disposed in the vicinity of the left end face of the light guide plate (20) (i.e., the first end of the optical guide member), and the thickness of the light guide plate

(20) decreases stepwise from the end where the light source (30) lies toward the front i.e., the width t_1 of the first end face (left end face) and a width t_2 of the second end face (right end face) of the optical guide member substantially satisfy $t_1 > t_2$.

Claims 5-6 and 11, Bao discloses (col.6, lines 52 – 57; Figs.1, 3) that the light guide plate (20) has a periodic structure (stepwise surface) formed on the upper face (the second principal face) of the light guide plate (20), and the illumination light advancing horizontally in the light guide plate (20) is reflected at the step (21) and enters into the panel (0), while the illumination light reflected from the substrate (2) is emitted through the planar section (22) of the light guide plate (20), such that the periodic structure (stepwise surface) has propagation portions (advancing the light and emitting the light at planar section 22) and reflection portions (reflecting the light at step 21) alternating along a third direction, and the third direction coincides neither the horizontal direction (X) (the first direction) nor the vertical direction (Y) (the second direction), and the incident light from the light source (30) is subjected to total reflection at the reflection portions.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bao and Yamanashi as applied to claims 1-6 and 10-11 above, and further in view of US 6,124,971 (Ouderkirk et al).

Claim 7, lacking limitation is such that the optical guide member includes an antireflection element on the first principle face.

However, Ouderkirk discloses (col.15, lines 54- 63; Fig.12) that it is desirable to coat one or both sides of the reflective polarizing element with an antireflection coating,

such that the light traverses each component twice in a reflective LCD, and decreasing the light losses due to the surface reflections. Such that using the antireflection element provided on the lower face of the light guide plate (the first principal face of the optical guide member) would prevent light losses due to the surface reflection so as to improve the display performance.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to use an antireflection element provided on the optical guide member as claimed in claim 7 for preventing light losses and improving the display performance.

6. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bao and Yamanashi as applied to claims 1-6 and 10-11 above, and further in view of US 5,788,356 (Watai et al).

Claim 8, lacking limitation is such that a light shielding member is disposed corresponding to a connection or transition portion between the optical guide member and the light source.

However, Watai discloses (col.9, lines 8 – 14; Fig.3) that the light shielding walls (8, 9) are adapted to prevent the light emitted from the light source element (2) from intruding through the gaps (G1 to G4) between the respective elements or the end surface of the end edge portion (3a) of the additional element (3) (such as the upper face of the light guide plate). Therefore, the light shielding wall (8, 9) would prevent light leakage and improve the light utilization, so as to increase the display contrast. It was common and known in the art as the light is most strong and glaring at the position

around the light source. Therefore, a light shielding member such as light shielding film is disposed between the optical guide member and the light source, i.e., around the light source corresponding to a connection or transition portion between the light guide and the light source, so as to increase the display contrast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a light shielding member as claimed in claim 8 for increasing the display contrast.

Claim 9, the limitation is only given weight as intended use, because any display can be used in an electronic device, and that would have been at least obvious.

Allowable Subject Matter

7. Claims 13-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim, and any intervening claims.

The prior art of record neither discloses nor teaches a liquid crystal display apparatus comprising various elements, more specifically, as the following:

The pitch ratio of the color pixels of the X direction and the Y direction is between 1:2 and 1:2.5 [claim 13, as shown in Fig.12];

the third direction of the periodic structure on the optical guide member is at an angle of about 10° to about 25° from the first direction (X) (horizontal direction) [claim 14, as shown in Fig.1B];

the third direction of the periodic structure on the optical guide member is at an angle of about 55° to about 80° from the first direction (X) (horizontal direction), [claim 15, as shown in Fig.1B].

The closest references US 6,266,108 (Bao et al), US 6,259,499 (Yamanashi) disclose a reflective liquid crystal display device having a LCD panel, a light guide plate, and the light guide plate having stepwise surface as a periodic structure to guide the light reflection and emission, but they do not disclose the light emission as the third direction arrangement as claimed in claims 14-15 having a specific angle range with respect to the horizontal direction (X direction), and specific pitch ratio of the color pixels as claimed in claim 13.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

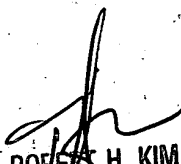
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
May 18, 2004



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